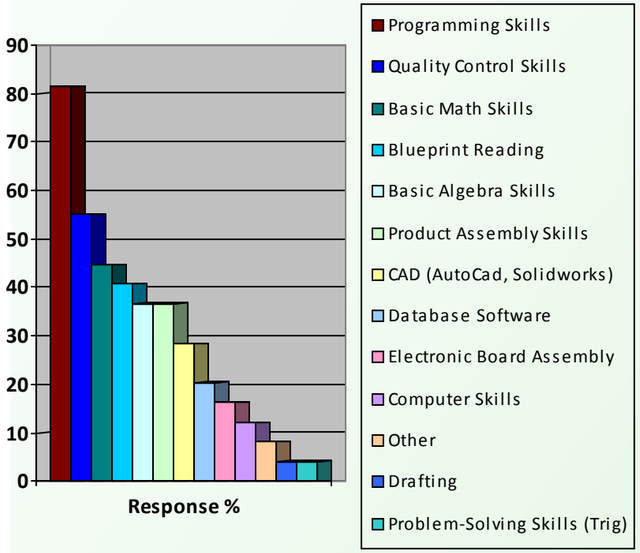
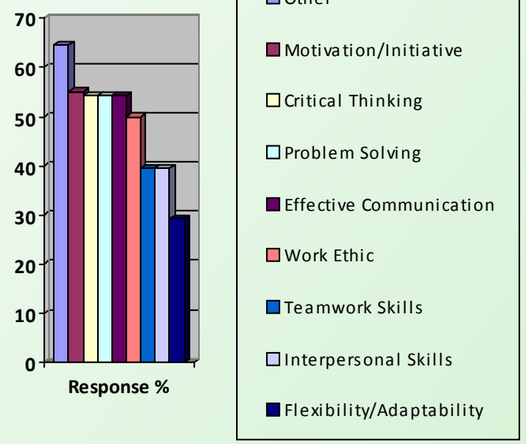



## Basic Manufacturing Skills Not Present in Newly Hired Workers

## Soft Skills Missing from Newly Hired Workers




*Based on 2010 Survey of Manufacturers in NH

## Cool Things Manufactured in New Hampshire

Advanced optical solutions for the aerospace and defense industry | Afterbite® | Air bearing valve boring machine | W.S. Badger® certified organic, healthy body care | Bio-therapeutics | Composite Antenna | Crystallanic Furnace for Solar Industry | D-4 differential air shaft | Dental implants of stainless steel and titanium | Elbow implants | Energy Efficient Wall & Roof Systems | Fish sticks | Flashing lights for emergency vehicles | Glass windows for space vehicles | Guide plate for escalators | Guided missile lens metrology platform | Infrared Jam Head | Knee implants | Lindt® Lindor Truffles | Multi Band Laser | N.I.F. fuel cell assembly station | NASA's NuSTAR telescope optics assembly station | Plasma Cutters |Satellite Circuit Card Assemblies | Segway® Personal Transporter | Targeting Binoculars | Vacuum chambers | Velcro Brand Fasteners®

## Recommendations to the NH Department of Education

- Develop and implement strategies for the advanced manufacturing sector to educate the parents, educators, and students about career opportunities
- Increase communication between manufacturing and education to assure alignment with current realities of the advanced manufacturing industry
- Strengthen math education to assure student success in areas relevant to their goals
- Increase accessibility to advanced pre-engineering/manufacturing education to all students

### Advanced Manufacturing Education Advisory Council

Senator Molly Kelly, Keene | Representative Sally Kelly, Chichester | Barbara Couch, Hypertherm I Jacqueline Guillette, Claremont | Marshall Derry, Nashua Technology Center| Victor Kissell, Tidland Corporation I Peter Kujawski, Sig Sauer | Margaret Callahan, Seacoast School of Technology| Lynn Kilchenstein, NHTI | Susan Bloom Newcomer, Greater Keene Chamber of Commerce | John Olson, Whelen Engineering, | Robert Jerard, UNH , Department of Mechanical Engineering| Zenagui Brahim, Manufacturing Extension Partnership | Paul Leather, Department of Education | Lisa Danley, Department of Education

NH Department of Education
101 Pleasant Street | Concord, NH | 03301-3494
(603) 271-3494
http://www.education.nh.gov/

# Connecting Education to Advanced Manufacturing in New Hampshire

## Executive Summary

New Hampshire has traditionally been a leader in manufacturing. It is essential that we continue this role as we move forward out of our national recession. In support of this, the New Hampshire General Court passed legislation in 2008 creating the Advanced Manufacturing Education Advisory Council. Members include lawmakers, manufacturers and educators who focused their work on the charge of the council:

*"to advise the Department of Education in the implementation, evaluation, and expansion of the advanced manufacturing curriculum, to assist the Department of Education in pursuing public and private funds in order to ensure statewide access for all public high school students to advanced manufacturing curriculum coursework."*

There began a long journey of learning about curricula and programs in advanced manufacturing presently offered in high schools and colleges. Council members learned about related coursework and requirements for high school graduation while hearing of the challenges manufacturers face in hiring workers who were inadequately prepared to become employed in manufacturing positions. We discovered outstanding career and technical education programs in our high schools that are closely connected to manufacturing companies around the state. Yet we also learned of a lack of awareness related to the potential for exciting and challenging careers in the field of manufacturing.

The council conducted a survey of New Hampshire manufacturers who not only identified new workers that will be needed in the next three to five years but also the challenge of new workers lacking needed skills in math, programming and basic problem solving.

Manufacturing, as many perceive it, has changed dramatically over the past ten years. The realities of today's manufacturers include high paying jobs in pristine, state-of-the-art workplaces that consistently reach into new technology and development of innovative products.

Partnerships between manufacturing businesses and education institutions are essential in preparing students for manufacturing careers. Building these collaborative relationships is a key to success for both employees and employers in this important and viable industry.

Enclosed is a summary of our work. We have identified New Hampshire's strengths, revealed the challenges as well as the opportunities and conclude with recommendations. Among these recommendations, we would like to see schools develop a stronger math curriculum that is relevant to advanced manufacturing, offer more opportunities for hands-on internships and highlight proven programs.

Manufacturing will continue to face challenges as we move forward to the future. It is essential our students and potential workers have the knowledge and skills needed to continue to advance this vital sector of our economy in New Hampshire.

### NH Manufacturing Facts

*Top 5 Industries in NH*

- ⇒ Manufacturing—**13.9%**
- ⇒ Finance and Insurance—**9.9%**
- ⇒ Health Care and Social Services—**9.7%**
- ⇒ Retail—**9.3%**
- ⇒ Professional Scientific and Technical Services—**7.5%**

- Since 2003, manufacturing exports rose nearly 3X faster than the state's economy.
- Manufacturing accounts for 95 percent of exports ( 2009)
- Manufacturing brings NH 4X as much money as tourism
- Average annual compensation of manufacturing jobs: $75,027

**Governor's Advanced Manufacturing Educational Advisory Council**

# Connecting Education to Advanced Manufacturing in New Hampshire

## Current State

### Manufacturing Industry

- **Strengths:**
  Investment by many companies in employee development
- **Challenges:**
  - Need for statewide strategies for promoting manufacturing
  - Inconsistent communication between manufacturing and the education sector
  - Career opportunities exceed qualified applicants

### NH Department of Education

- **Strengths:**
  - Effective manufacturing programs at some Career and Technical Education Centers (CTE) accessible to some students
- **Challenges:**
  - Manufacturing opportunities not well articulated to students
  - Lack of strategic collaboration between industry and education
  - Number and placement of manufacturing programs limited

### Local School Districts

- **Strengths:**
  - Successful curricular and co-curricular programs
  - Many manufacturing programs in Career and Technical Education Centers (CTE) align with post-secondary education.
  - Post-secondary articulation agreements and dual credit opportunities
- **Challenges:**
  - Raising the threshold of math and communication skills of high school graduates for manufacturing
  - Exposure of student, staff, and faculty to the history, value and current and/or future state of manufacturing
  - Traditional school schedules and teacher contracts limit opportunities

### Post-Secondary Education

- **Strengths:**
  - Students successfully transition from high school to two-and four-year programs in manufacturing
  - Advanced manufacturing programs continuously update curricula to align with industry needs
  - Engineering technology programs collaborate with local school districts to align curricula
- **Challenges:**
  - Opportunities for manufacturing training are not uniformly available statewide
  - Strategies for responding to manufacturing industry needs to be strengthened

## Future State

### Manufacturing Industry

- Life-long advancement opportunities provided by manufacturing industry
- Increased number of qualified applicants for manufacturing careers
- Collaboration between manufacturing and education
- Manufacturers promoting their industry within education sector

### NH Department of Education

- Successful practices shared among Career and Technical Education Centers and Comprehensive High Schools
- Increased programs and opportunities in advanced manufacturing for all students
- Systematic collaboration between manufacturing and education sectors

### Local School Districts

- Expanded agreements with post secondary
- Required career exploration for graduation
- Opportunities for students to participate in curricular and co-curricular programs
- Manufacturing applicants prepared to enter work force
- Equal access for students to prepare for manufacturing careers
- Guidance counselors understand the potential for careers in manufacturing
- Flexible teacher contracts and school calendars support career manufacturing programs
- Math education relates to careers in advanced manufacturing

### Post-Secondary Education

- Educational experiences prepare the workforce for the future in manufacturing
- Statewide opportunities for access to advanced manufacturing programs

**The economic vitality of the state depends on creating an educational infrastructure that supports manufacturing.**